# **EMC TEST REPORT**

Test item

: 200CH Handheld Radio Scanner

Model No.

: PRO-649

Order No.

: DTNC1504-01883

Date of receipt

: 2015-04-20

Test duration

: 2015-04-21 ~ 2015-04-22

Date of Issue

: 2015-05-08

Applicant

: The Whistler Group, Inc.

168 Ayer Road, Littleton, MA 01460, USA

Test laboratory

: DT&C Co., Ltd.

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification

: ANSI C 63.4:2009

FCC Part 15 Subpart B (Scanning receiver)

Test environment

: Temperature : (17 ~ 19) °C,

Humidity: (39 ~ 41) % R.H.

Test result

: X Comply

☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose.

This test report shall not be reproduced except in full, without the written approval of Dt&C Co., Ltd.

Tested by:

Reviewed by:

Engineer DaeHwa Eun Technical Manager YoungKyu Shin

PRESIDENT OF DT&C Co., Ltd.

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### 1. General Remarks

This report contains the result of tests performed by:

Dt&C Co., Ltd.

Address: 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

http://www.dtnc.net

Tel: +82-31-321-2664 Fax: +82-31-321-1664

### 2. Test Laboratory

Dt&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
	USA	FCC	KR0034 101842 678747, 596748, 804488, 165783	Accredited 2.948 Listed
Cita Filipa	Canada	IC	5740A-1 5740A-2	Registered
Site Filing	Japan	Japan VCCI		Registered
0 115 11	Korea	КС	KR0034	Designation
Certification	Germany	TUV	CARAT 13 11 86721 001	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

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## 3. General Information of EUT

Kind of Equipment	200CH Handheld Radio Scanner				
Model No.	PRO-649				
Add Model No	None				
Serial No	None				
FCC ID	HSXSC01				
Supplied Dower for Toot	INPUT : 120 V, 60 Hz				
Supplied Power for Test	OUTPUT: 9 V				
Applicant	The Whistler Group, Inc.				
Applicant	168 Ayer Road, Littleton, MA 01460, USA				
	RDX, Inc				
Manufacturer	106 Daeryung Techno Twon 3, 115 Gasan Digital 2-ro,				
	Guemcheon-gu, Seoul, Korea				
Footom:	Radix Telecom Phils., Industries Inc.				
Factory	P-IMES Bldg.2. Block 16, Phase IV Peza Rosario Cavite, Philippines				

Related Submittal(s) / Grant(s)
Refer to Appendix 3 (Changed Part List)

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## 4. Test Summary

## 4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2009	С
Radiated Disturbance	ANSI C63.4:2009	С
Antenna Power Conduction	ANSI C63.4:2009	С
C=Comply N/C=Not Comply	y N/T=Not Tested N/A=Not Applicable	

The data in this test report are traceable to the national or international standards.

### 4.2 Test environment and conditions

Test Items	Test date (YYYY-MM-DD)	Temp (℃)	Humidity (% R.H.)
Conducted Disturbance	2015-04-21	19	39
Radiated Disturbance	2015-04-21	17	41
Antenna Power Conduction	2015-04-22	19	39

### 4.3 Test result Summary

#### (1) Conducted Emission

Frequency	Phase	Result	Detector	Limit	Margin
[MHz]	Filase	[dBµV]	Detector	[dBµV]	[dB]
0.68543	L1	28.7	Quasi-Peak	56.0	27.3

#### (2) Radiated Emission

Frequency	Pol.	Result	Limit Detector		Margin
[MHz]	1 01.	[dB(µV/m)]	Detector	[dB(µV/m)]	[dB]
445.553	Н	38.2	Quasi-Peak	46.0	7.8

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## 5. Test Set-up and operation mode

### 5.1 Principle of Configuration Selection

**Emission**: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 5.2 Test Operation Mode

- The EUT was set to constantly scan all bands. (MODE 1)
- The EUT was set to connect PC/IF cable to the scanning receiver for receiving data and status. (MODE 2)

### 5.3 Support Equipment Used

					Back	FCC			
Unit	Model No.	Serial No.	Manufacturer	Connect type	Length (m)	shield	With Ferrite	shell	ID
Scanning Receiver	PRO-649	N/A	The Whistler Group, Inc.	STEREO	1.6	Non-shield	Х	Plastic	DOC
Adaptor	DECU 27035	N/A	Radioshack	POWER	2.0	Non-shield	Х	Plastic	DOC
Headset	COV-903	N/A	COSY	STEREO	2.0	Non-shield	Х	Plastic	DOC

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#### 6. Test Results: Emission

#### 6.1 Conducted Disturbance

#### 6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4.** 

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Connect the EUT's power source lines to the PC power through the LISN. All the other peripherals are connected to the 2<sup>nd</sup> LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

#### 6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

	Limits dB(μV)						
Frequency range (MHz)	Quas	si-peak	Average				
(111112)	Class A	Class B	Class A	Class B			
0.15 to 0.50	79	66 to 56	66	56 to 46			
0.50 to 5	70	56	00	46			
5 to 30	73	60	60	50			

Note 1 The lower limit shall apply at the transition frequencies.

Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note) 1. Emission Level = Reading Value + Correction Factor.

- 2. Correction Factor = Cable Loss + Insertion Loss of LISN
- 3. Margin = Limit Emission level

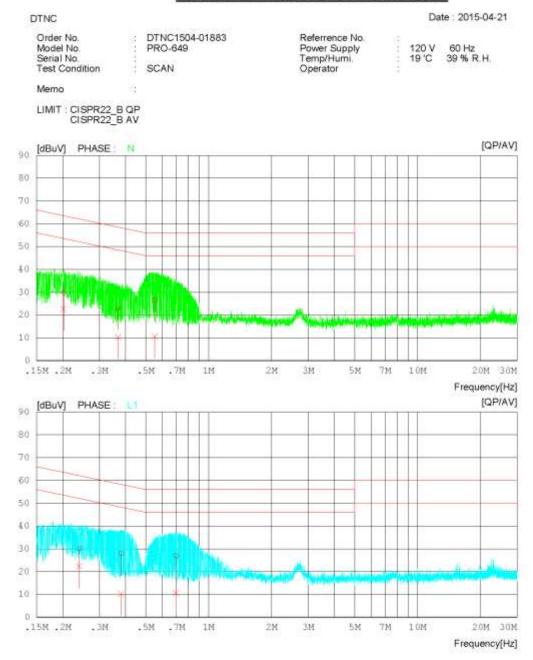
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#### **Test Result**

#### MODE 1

### Results of Conducted Emission



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# Results of Conducted Emission

Date: 2015-04-21 DTNC

Order No.

: DTNC1504-01883 : PRO-649 : SCAN Referrence No. Power Supply Temp/Humi. 120 V 60 Hz 19 'C 39 % R.H. Model No. Serial No. Test Condition Operator

Memo

LIMIT : CISPR22\_B QP CISPR22\_B AV

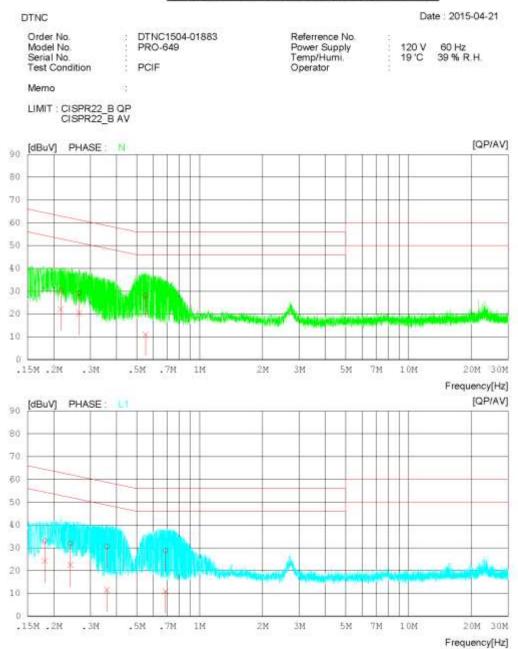
NO	FREQ	READ	ING	C.FACTOR	RES	ULT	LI	TIP	MA:	RGIN	PHASE
		QP	AV		QP	AV	QP	AV	~	AV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV	] [dBuV]	
1	0.20159	19.9	12.7	9.9	29.8	22.6	63.5	53.5	33.7	30.9	N
2	0.36854	13.0	0.2	10.1	23.1	10.3	58.5	48.5	35.4	38.2	N
3	0.55193	16.4	0.6	10.1	26.5	10.7	56.0	46.0	29.5	35.3	N
4	0.24016	20.1	12.4	10.0	30.1	22.4	62.1	52.1	32.0	29.7	L1
5	0.38157	17.8	0.1	10.1	27.9	10.2	58.2	48.2	30.3	38.0	L1
6	0.69858	16.9	0.6	10.0	26.9	10.6	56.0	46.0	29.1	35.4	L1

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#### MODE 2

## Results of Conducted Emission



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## Results of Conducted Emission

Date: 2015-04-21 DTNC

Order No.

: DTNC1504-01883 : PRO-649 : Referrence No. Power Supply Temp/Humi. 120 V 60 Hz 19 'C 39 % R.H. Model No. Serial No. Test Condition

Operator

Memo

LIMIT : CISPR22\_B QP CISPR22\_B AV

N	) FREQ	READING OP AV	C.FACTOR	RES OP	ULT AV	LII OP	TIM VA	MA OP	RGIN AV	PHASE
	[MHz]	[dBuV] [dBuV	7] [dB]	~	[dBuV]	~	] [dBuV]	~		]
1	0.21621	20.3 12.2	9.9	30.2	22.1	63.0	53.0	32.8	30.9	N
2	0.26493	19.2 10.5	9.9	29.1	20.4	61.3	51.3	32.2	30.9	N
3	0.55029	18.1 1.0	10.1	28.2	11.1	56.0	46.0	27.8	34.9	N
4	0.18150	23.1 14.2	10.0	33.1	24.2	64.4	54.4	31.3	30.2	L1
5	0.24041	21.9 12.5	10.0	31.9	22.5	62.1	52.1	30.2	29.6	L1
6	0.35956	20.4 1.5	10.1	30.5	11.6	58.7	48.7	28.2	37.1	L1
7	0.69543	19 7 0 0	10 0	29 7	10 0	56.0	16 0	27 2	25. 1	т 1

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#### 6.2 Radiated Disturbance

#### 6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with ANSI C63.4.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the **10m semi-anechoic chamber.** 

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Peak detector with 1 MHz RBW and 1 MHz VBW were used for above 1 GHz frequency range, also used linear average detector with defined in CISPR 16-1-1.

For further description of the configuration refer to the picture of the test set-up.

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#### 6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1 000
108 – 500	2 000
500 – 1 000	5 000
Above 1 000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

#### (1) Limit for Radiated Emission below 1 000 MHz

Frequency range (MHz)	Class A Equipment (10 m distance) Quasi-peak (dBµV/m)	Class B Equipment (3 m distance) Quasi-peak (dBµV/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

Frequency range	Class A Equipment (10 m distance)	Class B Equipment (10 m distance)
(MHz)	Quasi-peak (dBµV/m)	Quasi-peak (dΒμV/m)
30 to 230	40	30
230 to 1 000	47	37

#### (2) Limits for Radiated Emission above 1 000 MHz at a measuring distance of 3 m

Frequency	Class A E	quipment	Class B E	quipment
(GHz)	Peak (dBµV/m)	Average (dBµV/m)	Peak (dBµV/m)	Average (dBµV/m)
1 to 40	80	60	74	54

Note)1. Emission Level = Reading Value + loss - gain + Ant Factor

- 2. Margin = Limit Emission level
- 3. Loss = Cable loss, Gain = Amp gain, Ant Factor = Antenna Factor

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#### Test Result

#### < 30 MHz $\sim 1$ GHz $\_$ MODE 1 >

## RADIATED EMISSION

Date: 2015-04-21

Order No. Model No. Serial No. Test Condition

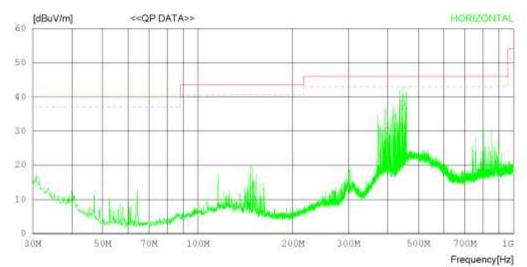
Memo

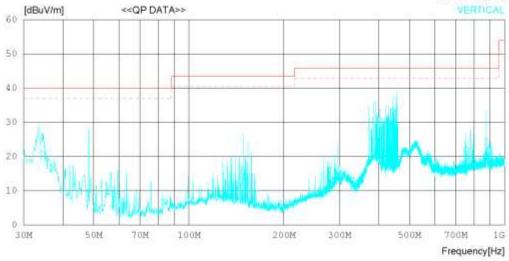
DTNC1504-01883 PRO-649 Reference No. Power Supply Temp/Humi Operator

120 V 60 Hz 17 'C 41 % R.H.

Condition : SCAN

LIMIT : FCC Part15 Subpart.B Class B (3m) MARGIN: 3 dB





TRF-EM-003(00)081218

Report No.: DREFCC1505-0209

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## **RADIATED EMISSION**

Date: 2015-04-21

Order No. Model No. Serial No. Test Condition DTNC1504-01883 PRO-649

SCAN

Reference No. Power Supply Temp/Humi Operator

120 V 60 Hz 17 'C 41 % R.H.

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) MARGIN: 3 dB

No.	. FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
 	Horizont	al								
2	438.260 445.553 451.766	40.0 45.7 44.0	16.5 16.6 16.7	2.2 2.2 2.2	26.3 26.3 26.3	3 38.2	46.0 46.0 46.0	13.6 7.8 9.4	169 100 100	98 243 205
 	Vertical	L								
7	34.079 48.053 150.360 446.036	31.0 26.5 28.7 39.8	16.5 9.5 10.5 16.6	0.8 0.7 1.4 2.2	26.0 26.0 26.5 26.5	6 10.1 5 14.1 3 32.3	40.0 40.0 43.5 46.0	18.3 29.9 29.4 13.7	100 100 100 100	265 207 0 188
8	452.045	41.2	16.7	2.2	26.3	3 33.8	46.0	12.2	100	182

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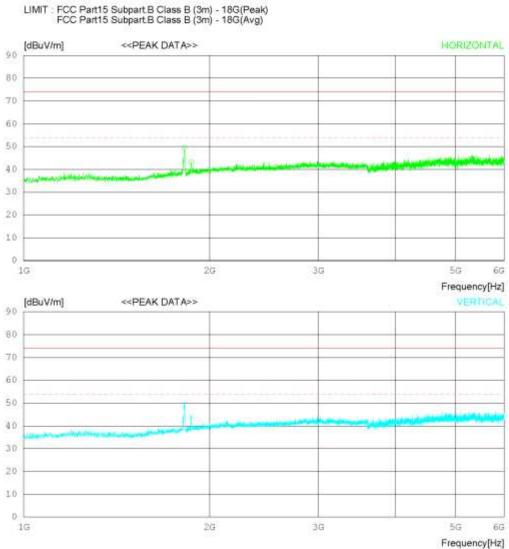
### < (1 ~ 6) GHz \_ Peak \_ MODE 1 >

## **RADIATED EMISSION**

Date: 2015-04-21

Order No. Model No. DTNC1504-01883 PRO-649 Reference No. Power Supply 60 Hz 41 % R.H. 120 V Serial No. Temp/Humi 17 'C **Test Condition** SCAN Operator

Memo



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## **RADIATED EMISSION**

Date: 2015-04-21

 Order No.
 :
 DTNC1504-01883
 Reference No.
 :
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Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak) FCC Part15 Subpart.B Class B (3m) - 18G(Avg)

No.	FREQ	READING		LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
	Horizont	al								
1 2	1820.625 1867.500			4.5 4.6	49.2 49.3		74.0 74.0	24.6 30.8	100 100	0 284
	Vertical									
3 4	1820.625			4.5	49.2		74.0 74.0	24.8	100	231 358

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### < (1 ~ 6) GHz \_ Average \_ MODE 1 >

## **RADIATED EMISSION**

Date: 2015-04-21

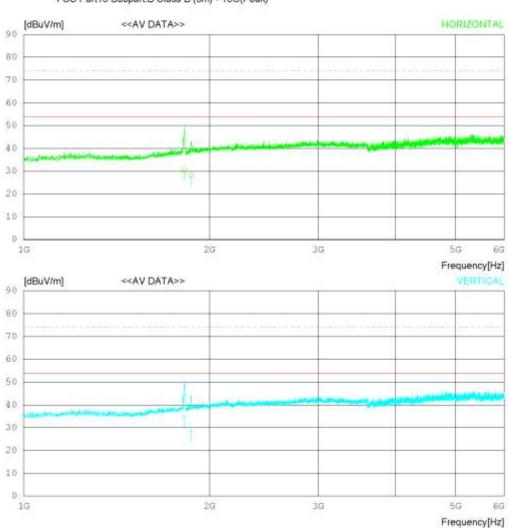
Order No. Model No. Serial No. **Test Condition**  DTNC1504-01883 PRO-649 SCAN

Reference No. Power Supply Temp/Humi Operator

60 Hz 41 % R.H. 120 V 17 'C

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg) FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



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## **RADIATED EMISSION**

Date: 2015-04-21

 Order No.
 : DTNC1504-01883
 Reference No.
 : Image: Condition of the property of the p

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg) FCC Part15 Subpart.B Class B (3m) - 18G(Peak)

No.	FREQ	READING		LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	AV [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
	Horizont	al								
	1820.075 1867.324		30.7 31.0	4.5 4.6	49.2 49.3		54.0 54.0	23.4 25.6	100 100	96 284
	Vertical									
	1820.625 1867 500		30.7 31.0	4.5	49.2	34.9	54.0 54.0	19.1	100	221 161

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### < 30 MHz $\sim 1$ GHz $\_$ MODE 2 >

## RADIATED EMISSION

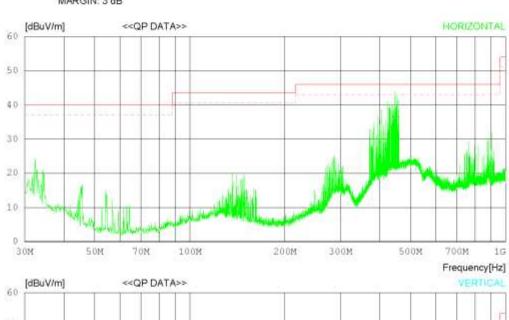
Date: 2015-04-21

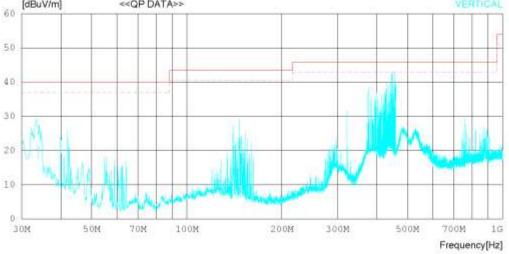
Order No. Model No. Serial No. Test Condition DTNC1504-01883 PRO-649 PCIF Reference No. Power Supply Temp/Humi Operator

120 V 60 Hz 17 'C 41 % R.H.

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) MARGIN: 3 dB





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## **RADIATED EMISSION**

Date: 2015-04-21

Order No. Model No. Serial No. Test Condition DTNC1504-01883 PRO-649

Reference No. Power Supply Temp/Humi Operator

120 V 60 Hz 17 'C 41 % R.H.

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) MARGIN: 3 dB

: PCIF

No. FR	~		LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
[MH	QP z] [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
Hori	zontal								
1 447.0 2 449.3		16.7 16.7	2.2 2.2	26.3 26.3		46.0 46.0	9.4 8.0	200 100	0 339
Vert	ical								
3 33.8 4 147.0 5 444.2	37.3 200 43.6	16.7 10.7 16.6	0.8 1.4 2.2	26.6 26.5 26.3	22.9 36.1	40.0 43.5 46.0	19.0 20.6 9.9	199 100 100	0 169 227 173

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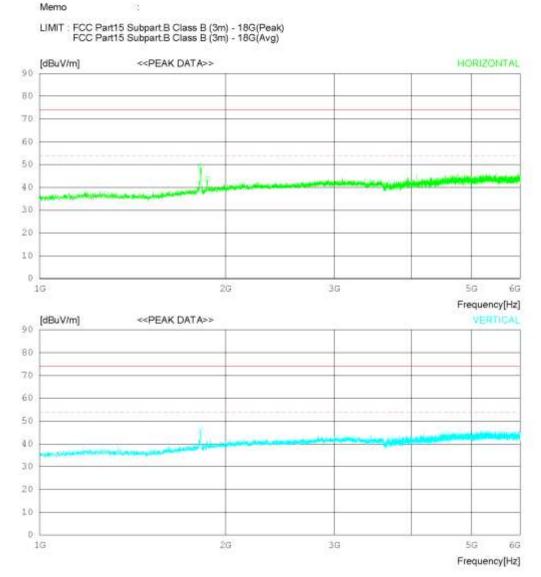
Total 32 pages

### < (1 ~ 6) GHz \_ Peak \_ MODE 2 >

## **RADIATED EMISSION**

Date: 2015-04-21

 Order No.
 DTNC1504-01883
 Reference No.
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## **RADIATED EMISSION**

Date: 2015-04-21

 Order No.
 DTNC1504-01883
 Reference No.
 :
 Lower Supply
 120 V
 60 Hz

 Model No.
 :
 PRO-649
 Power Supply
 :
 120 V
 60 Hz

 Serial No.
 :
 Temp/Humi
 :
 17 'C
 41 % R.H.

 Test Condition
 :
 PCIF
 Operator
 :
 .

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak) FCC Part15 Subpart.B Class B (3m) - 18G(Avg)

No.	FREQ	READING		LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	] [dB]	[cm]	[DEG]	
	Horizont	al									
1 2	1821.25 1867.50	0 63.2 0 57.3		4.5 4.6	49.2 49.3	49.2 43.6	74.0 74.0	24.8 30.4	100 100	358 358	
	Vertical										
3	1821.25	0 60.0	30.7	4.5	49.2	46.0	74.0	28	100	1	

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### < (1 ~ 6) GHz \_ Average \_ MODE 2 >

## **RADIATED EMISSION**

Date: 2015-04-21

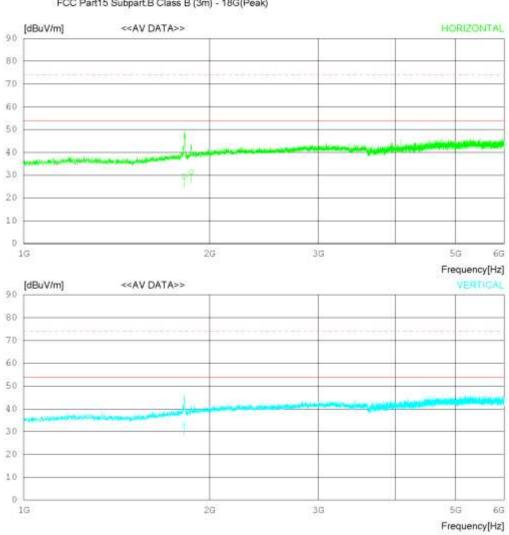
Order No. Model No. Serial No. Test Condition DTNC1504-01883 PRO-649 Reference No. Power Supply Temp/Humi Operator

120 V 60 Hz 17 'C 41 % R.H.

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg) FCC Part15 Subpart.B Class B (3m) - 18G(Peak)

PCIF



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## **RADIATED EMISSION**

Date: 2015-04-21

Order No. Model No. Serial No. Test Condition DTNC1504-01883 PRO-649 Reference No. Power Supply Temp/Humi Operator

120 V 60 Hz 17 'C 41 % R.H.

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg) FCC Part15 Subpart.B Class B (3m) - 18G(Peak)

PCIF

ИО	. FREQ	READING AV	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]		[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
	Horizont	al								
	1821.250 1867.500		30.7 31.0	4.5 4.6	49.2 49.3		54.0 54.0	24.5 22.6	100 100	169 165
	Vertical									
3	1821.250	47.3	30.7	4.5	49.2	33.3	54.0	20.7	100	116

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#### 6.3 Antenna Power Conduction

#### 6.3.1 Measurement Procedure

Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals.

Antenna conducted power measurements was performed with the EUT antenna terminals connected directly to measuring instrument using a impedance-Matching network to connect the measurement Instrument to the antenna terminals of the EUT.

The losses in decibels in impedance-matching network and cables was added to the measured values in dBµV.

The measurements were repeated with the receiver tuned to a frequency until all of frequencies had been successively measured.

Power in the receive antenna terminals in the ratio of  $V^2/R$ , where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.

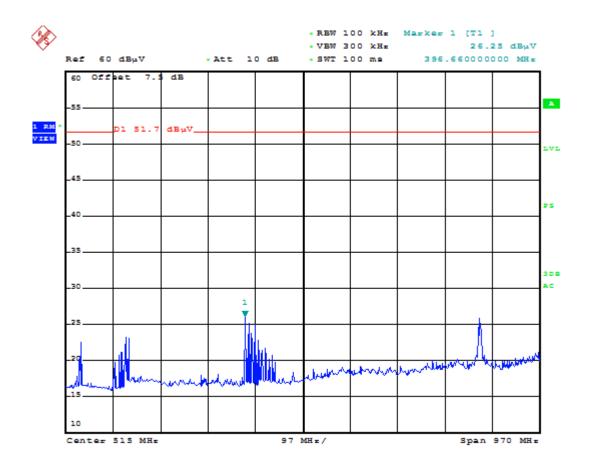
#### 6.3.2 Limit for Antenna Power Conduction

- Limit : **2nW(51.7 dBμV)** 

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### **Test Result**



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### **Appendix 1**

### **List of Test and Measurement Instruments**

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To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

### 1. Conducted Disturbance

N	ame of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
	MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0143	TSJ	N/A	N/A	N/A
	SPECTRUM ANALYZER	8591E	H/P	3649A05889	N/A	N/A
	ARTIFICIAL MAINS NETWORK	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2014.06.26	2015.06.26
	LISN	KNW-407	KYORITSU	8-317-8	2015.01.07	2016.01.07
	50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06
$\boxtimes$	EMI TEST RECEIVER	ESCI7	ROHDE & SCHWARZ	100910	2015.02.25	2016.02.25
$\boxtimes$	LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2014.09.11	2015.09.11
$\boxtimes$	PULSE LIMITER	ESH3-Z2	ROHDE & SCHWARZ	101334	2015.01.07	2016.01.07
	50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06

#### 2. Radiated Disturbance

Na	ame of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
$\boxtimes$	MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0121	TSJ	N/A	N/A	N/A
$\boxtimes$	EMI TEST RECEIVER	ESU 8	ROHDE & SCHWARZ	100348	2014.10.21	2015.10.21
$\boxtimes$	BILOG ANTENNA	CBL6112B	SCHAFFNER	2737	2014.12.10	2016.12.10
$\boxtimes$	LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2015.02.25	2016.02.25
$\boxtimes$	HORN ANTENNA	3117	ETS-LINDGREN	00152093	2014.01.30	2016.01.30
$\boxtimes$	PREAMPLIFIER	MLA-100M18-B01-42	TSJ	1872271	2014.05.26	2015.05.26
	EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2015.02.25	2016.02.25
	AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2015.02.25	2016.02.25

#### 3. Antenna Power Conduction

Name of Instrument		Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
$\boxtimes$	EMI TEST RECEIVER	ESCI7	ROHDE & SCHWARZ	100910	2015.02.25	2016.02.25
$\boxtimes$	SPLITTER	ZFRSC-42	MINI CIRCUITS	SF624000603	2014.06.27	2015.06.27

## Appendix 2

## **Report Revision History**

Revision	Description	Revised By	Revision	
Date	Description	Revised by	Reviewed By	
None	Original	N/A	N/A	

### Appendix 3

## **Changed Part List**

Section		Fram			Remarks	To				0
section	Ref.no	Description Part No.		Kemanks	Ref.no	Description		Part No.	Remarks	
		ETC ELEC ASS'Y			DELETE					COMBINED
	_	SPEAKER WIRE		UL1571 AWG28 L=98mm 2 PIN	ASS'Y CHANGED	1 .	SPEAKER 1	WIRE	UL1571 AWG28 L=98mm 2 PIN	ASS'Y CHANGI
Mechanical PL	5	LCD INTERCONNECTOR		GR-06D-1052	ASS'Y CHANGED	2	LCD INTE	RCONNECTOR	GR-06D-1052	ASS'Y CHANG
		SPEAKER		GR-05D-3360	ASS'Y CHANGED	1	SPEAKER		GR-05D-3360	ASS'Y CHANG
						11	PCB	LOGIC 2L FR-4 T=1.0mm	70834032730	ADD
	C215	CAP CHIP	0.001uF 50V +/-10%	GRM188(R7/B1)1H102K	CHANGED	C215	CAP CHIP		GRM188(R7/B1)1H103K(A01D/Z01D)	CHANGED
	C216	CAP CHIP TANTAL	10uF 10V +/-20%	TCSCS1A106MP	DELETE					
	C217	CAP CHIP	22pF 50V +/-5%	GRM1885C1H220J(A01D/Z01D)	DELETE					
	C218	CAP CHIP	22pF 50V +/-5%	GRM1885C1H220J(A01D/Z01D)	DELETE		<b>†</b>			
	C219	CAP CHIP	47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	DELETE					
	C225	CAP CHIP	47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	CHANGED	C225	CAP CHIP	(0603) 0.001uE 50V +/-5%	GRM188(5C/2C)1H102J(A01D/Z01D)	CHANGED
	C228	CAP CHIP	0.001uF 50V +/-10%	GRM188/R7/B1)1H102K	CHANGED	C228			GRM188(5C/2C)1H102J(A01D/Z01D)	CHANGED
	C233	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	C233			GRM188(R7/B1)1H103K(A01D/Z01D)	CHANGED
	C234	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	C234	CAP CHIP		GRM1885C1H220KA01D/Z01D)	CHANGED
	C235	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	C235		(0603) 22pF 50V +/-5%	GRM1885C1H220KA01D/Z01D)	CHANGED
	C236	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	C236		SMD(P CASE 0805)10uF 10V		CHANGED
	C237	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	C237			TCSCS1C105MP/TCP1A105M8R	CHANGED
	C244	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	(244		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	CHANGED
	C245	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101/(A01D/Z01D)	CHANGED	C245		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	CHANGED
	C246	CAP CHIP	100pF 50V +/-5%	GRM1885C1H101J(A01D/Z01D)	CHANGED	C246		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	CHANGED
	CETO	CH CH	100pi 301 1, 370	UNITED STATES	CIBINOLD	C251		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
	_					C252		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						C253		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						C254		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
	_		_			C255		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						C255		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
			-	_		C257		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						C258			GRM1885C1H470(A01D/Z01D)	ADD
	_		_	_		C258		(0603)47pF 50V +/-5% (0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
						C262		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
	_		_	_		C263		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
								(0603)47pF 50V +/-5%		ADD
				+		C264 C265			GRM1885C1H470I(A01D/Z01D)	ADD
								(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	
						C270		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
						C271		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						C272		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
	$\vdash$	-	+		+	C273		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
	-					C274 C275		(0603)47pF 50V +/-5% (0603)47pF 50V +/-5%	GRM1885C1H470I(A01D/Z01D) GRM1885C1H470I(A01D/Z01D)	ADD ADD
	-				+	C276 C277		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD ADD
	$\vdash$			+	+	C277		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
	$\vdash$	-	+	+	+			(0603)47pF 50V +/-5%	GRM1885C1H470X(A01D/Z01D)	
	$\vdash$			+		C279		(0603)47pF 50V +/-5%	GRM1885C1H470/(A01D/Z01D)	ADD
				+	+	C280		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
	-				+	C281		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
	$\vdash$			+	+	C282			GRM1885C1H470J(A01D/Z01D)	ADD
	<b>—</b>			+		C283		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
	<u> </u>					C284		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C285		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
	<u> </u>					C286		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
	1	1		1		C287	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD

OGIC TOP+BOT						C289		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
> LOGIC PCB ASSY						C290	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C291	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C292	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C293	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C294	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						C295	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C296	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C297	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C298	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C299	CAP CHIP	(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C300		(0603)47pF 50V +/-5%	GRM1885C1H470J(A01D/Z01D)	ADD
						C301		(0603)47pF 50V +/-5%	GRM1885C1H470KA01D/Z01D)	ADD
						D208		SMD, (MARKING S3)	1SS357(TPH3,F)/CUS357	ADD
						D209		SMD. (MARKING S3)	1SS357(TPH3,F)/CUS357	ADD
	IC201	IC SMD	CPU	MN101C38CGP(GRE-0510)	CHANGED	IC201	IC SMD	CPU	MN101EF29G	CHANGED
	R224	RES CHIP	0.0	MCR03EZPJ474	DELETE	10201	3.410			
	R225	RES CHIP	47K ohm 1/10W +/-5%	MCR03EZPJ473	CHANGED	R225	DES CHID	(0603) 24K ohm 1/10W +/	MCBUSEADIONS	CHANGED
	R226	RES CHIP	47K ohm 1/10W +/-5%	MCR03EZPJ473	CHANGED	R226		(0603) 100K ohm 1/10W +		CHANGED
	R227	RES CHIP	47K ohm 1/10W +/-5%	MCR03EZPJ473	CHANGED	R227		(0603) 100K ohm 1/10W +		CHANGED
	R228	RES CHIP	18K ohm 1/10W +/-5%	MCR03EZPJ183	CHANGED	R228	RES CHIP	(0603) 100K ohm 1/10W +		CHANGED
	R231	RES CHIP	3.3K ohm 1/10W +/-5%	MCR03EZPJ332	CHANGED	R231	RES CHIP	(0603) 1K ohm 1/10W +/-		CHANGED
	R237	RES CHIP	47K ohm 1/10W +/-5%	MCR03EZPJ473	CHANGED	R237	RES CHIP	(0603) 10K ohm 1/10W +/	MCR08EZPJ103	CHANGED
	R238	RES CHIP	1K ohm 1/10W +/-5%	MCR03EZPJ102	DELETE					
	R239	RES CHIP	47K ohm 1/10W +/-5%	MCR03EZPJ473	CHANGED	R239	RES CHIP	(0603) 1K ohm 1/10W +/	MCR03EZPJ102	CHANGED
	R241	RES CHIP	1K ohm 1/10W +/-5%	MCR03EZPJ102	DELETE					
						R251		(0603) 47K ohm 1/10W +/		ADD
						R252		(0603) 47K ohm 1/10W +/		ADD
						R253	RES CHIP	(0603) 47K ohm 1/10W +/		ADD
						R254	RES CHIP	(0603) 47K ohm 1/10W +/		ADD
						R256	RES CHIP	(0603) 47K ohm 1/10W +/	MCR03EZPJ473	ADD
						R257	RES CHIP	(0603) 47K ohm 1/10W +/	MCR03EZPJ473	ADD
						R258	RES CHIP	(0603) 47K ohm 1/10W +/	MCR03EZPJ473	ADD
						R261	RES CHIP	(0603) 680 ahm 1/10W +/	MCR03EZPJ681	ADD
						R262	RES CHIP	(0603) 1K ohm 1/10W +/	MCR03EZPJ102	ADD
						R263	RES CHIP	(0603) 47K ohm 1/10W +/	MCR03EZPJ473	ADD
						R265	RES CHIP	(0603) 1K ohm 1/10W +/-	MCR03EZPJ102	ADD
						R266	RES CHIP	(0603) 47K ohm 1/10W +/	MCR03EZPJ473	ADD
						R267	RES CHIP	(0603) 3.3K ohm 1/10W +	MCR03EZPJ332	ADD
						R268	RES CHIP	(0603) 470K ohm 1/10W +	MCR03EZPJ474	ADD
						R269	RES CHIP	(0603) 10K ohm 1/10W +/		ADD
						R270	RES CHIP	(0603) 3.3K ohm 1/10W +		ADD
-						R271		(0603) 470K ohm 1/10W +		ADD
			+			R276	RES CHIP	(0603) 10K ohm 1/10W +/		ADD
						R277	RES CHIP	(0603) 4.7K ohm 1/10W +,		ADD
		<del> </del>			_	RA200		BLOCK 1Kohm 1/16W +/-59		ADD
		<del> </del>		<del> </del>	_	RA206		BLOCK 1Kohm 1/16W +/-59		ADD
		1				RA207		BLOCK 1Kohm 1/16W +/-59		ADD
						RA208		BLOCK 1Kohm 1/16W +/-59		ADD
						RA209	_	BLOCK 1Kohm 1/16W +/-59		ADD
						17	PCB		70834132730	ADD
		I	1	ı		C131	ICAP CHIP	(0603) 20pF 50V +/-5%	GRM1885C1H200KA01D/Z01D)	ADD

	C68	CAP ELECT	5X11 33uF 50V +/-20%	UVR1H330MDD	CHANGED	C68	CAP CHIP	SMD(0603) 0.1uF 16V +/-1	GRM188R71C104K(A01D/Z01D)	CHANGED
	C69	CAP ELECT	4X7 4.7uF 35V +/-20%	USA1V4R7MDD	CHANGED	C69	CAP ELEC	(5X11)33uF 50V +/-20%	UVR1H330MDD	CHANGED
	D1	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D1	DIODE	SMD VARICAPS	BB664-02V	CHANGED
	D10	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D10	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D12	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D12	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D14	CHIP DIODE	MARKING V	HVC308A-TRF-E	CHANGED	D14	DIODE	SMD VARICAPS	BB565-02V	CHANGED
	D15	CHIP DIODE	MARKING V	HVC308A-TRF-E	CHANGED	D15	DIODE	SMD VARICAPS	BB565-02V	CHANGED
	D16	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D16	DIODE	SMD VARICAPS	BB564-02V	CHANGED
	D17	CHIP DIODE	MARKING 3	HVC3D6A-8TRF/TRU-E	CHANGED	D17	DIODE	SMD VARICAPS	BB664-02V	CHANGED
	D18	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D18	DIODE	SMD VARICAPS	BB564-02V	CHANGED
	D19	CHIP DIODE	MARKING V	HVC3D8A-TRF-E	CHANGED	D19	DIODE	SMD VARICAPS	BB565-02V	CHANGED
	D2	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D2	DIODE	SMD VARICAPS	BB664-02V	CHANGED
	D20	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D20	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D21	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D21	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	DZZ	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	DZZ	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D24	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D24	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D25	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D25	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
INEAR TOP + BOT	D26	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D26	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
LINEAR PCB ASSY	D3	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D3	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
						D33	DIODE	SMD, (MARKING S3)	1SS357(TPH3,F)/CUS357	ADD
	D4	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D4	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D5	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D5	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D6	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D6	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D7	CHIP DIODE	MARKING V	HVC308A-TRF-E	CHANGED	D7	DIODE	SMD VARICAPS	BB565-02V	CHANGED
	D8	CHIP DIODE	MARKING V	HVC308A-TRF-E	CHANGED	D8	DIODE	SMD VARICAPS	BB565-02V	CHANGED
	D9	CHIP DIODE	MARKING 3	HSC277-TRF-E	CHANGED	D9	DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	IC2	IC SMD	DC-DC CONVERTOR	TK11819MTL-G	CHANGED	IC2	JC SMD	DC-DC CONVERTOR	AP3015A	CHANGED
	IC8	IC SMD	VOLTAGE REGULATOR	TK11235CMCL-G	CHANGED	IC8	IC SMD	VOLTAGE REGULATOR	XC6209E/F352MR(-G)	CHANGED
	IC9	IC SMD	VOLTAGE REGULATOR	TK11235CMCL-G	CHANGED	IC9	IC SMD	VOLTAGE REGULATOR	XC6209E/F352MR(-G)	CHANGED
	L12	CHIP COIL		GR-D864	CHANGED	L12	CHIP IND	SMD 22uH +/-10%	LB3218T220K	CHANGED
	Q1	CHIP TRANSISTOR	MARKING V11	3SK131-(V11)T1/T2/T2B-A	CHANGED	Q1	CHIP TRA	SMD,FET	BF908R	CHANGED
	Q3	CHIP TRANSISTOR	MARKING V13	3SK131-T2A-V13	CHANGED	Q3	CHIP TRA	/ SMD,FET	BF908R	CHANGED
	Q4	CHIP TRANSISTOR	MARKING HE	2SC4250	CHANGED	Q4	CHIP TRA	SMD, NPN (MARKING RF)	2SC4250(TE85L/R,F)	CHANGED
	Q5	CHIP TRANSISTOR	MARKING HE	2SC4250	CHANGED	Q5	CHIP TRA	SMD, NPN (MARKING RF)	2SC4250(TE85L/R,F)	CHANGED
	Q6	CHIP TRANSISTOR	MARKING HE	2SC4250	CHANGED	Q6	CHIP TRA	SMD, NPN (MARKING RF)	2SC4250(TE85L/R,F)	CHANGED
	Q7	CHIP TRANSISTOR	MARKING QO	2SC4250	CHANGED	Q7	CHIP TRA	SMD, NPN (MARKING QO)	2SC4215-O(TE85L/R,F)	CHANGED
	R71	RES CHIP	1K ohm 1/10W +/-5%	MCR03EZPJ102	CHANGED	R71	RES CHIP	(0603) 2M ohm 1/10W +/-	MCR03EZPF2004	CHANGED
	R72	RES CHIP	220 chm 1/10W +/-5%	MCR03EZPJ220	CHANGED	R72	RES CHIP	(0603) 107K ohm 1/10W +	MCR03EZPF1073	CHANGED
t	R73	RES CHIP	470K ohm 1/10W +/-5%	MCR03EZPJ474	DELETE					