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CE marking and product approvals

RF Test Report:

Airspan AirSynergy A25a

FCC ID:O2J-255AS

SC_TR_87_B

Prepared for:
Airspan Communications Ltd
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1 Revision History

Revision	Originator	Date	Comment
A	C Blackham	07 June 2013	1st release
B	C Blackham	20 June 2013	Added radiated emissions and mains conducted emissions results

2 Purpose

This document details the Airspan AirSynergy base station, model number SYN-CN-00-0A25A-000, designed for operation in the 2500 – 2572 MHz band.

3 Reference Documents

[Ref 1]	47CFR2	Title 47 Code of Federal Regulations Part 2: frequency allocations and radio treaty matters; general rules and regulations
[Ref 2]	47 CRF27	Title 47 Code of Federal Regulations Part 27: Miscellaneous wireless communication services
[Ref 3]	TIA-603-C	Land Mobile FM or PM – Communications Equipment – Measurement and Performance Standards
[Ref 4]	KDB 662911 D01 v01r02	Federal Communications Commission Office of Engineering and Technology Laboratory Division; Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)

4 Test Information

4.1 Client

Airspan Communications Ltd
Capital Point,
33 Bath Road
Slough,
SL1 3UF
UK

4.2 Test personnel

Conducted Emissions (sections 8 to 12)
Testing was performed by Charlie Blackham of Sulis Consultants Ltd at Airspan Communications offices on 6th June 2013.

Radiated Emissions and Mains Conducted emissions (sections 13 and 14)
Testing was performed by Dan Winstanley of TRaC Global Ltd at:

Chamber No.1, TRaC Global Ltd, Unit 1, Pendle Place, Skelmersdale, WN8 9PN, United Kingdom
FCC Registration number 444512

4.3 Test sample

The results herein only refer to sample detailed in section 6

5 Product Description

The Airsynergy unit supports operation with 5 and 10[1] MHz bandwidths, comprising 1024 subcarriers. Each of these subcarriers can be modulated in a number of modes:

- BPSK ½
- QPSK ½ and ¾
- 16 QAM ½ and ¾
- 64 QAM ½ and ¾
- 256QAM

Based on pre-testing, the following modulation schemes will be used during testing:

- 256 QAM 5/6

The unit is fitted with two RF transceiver RF ports, RF-1 and RF-3. These support MIMO operation and are connected to a variety of external cross-polarised sectored antennas having gains of up to 18.0 dBi.

Frequency of operation is aligned with EBS channels and operates within the 2500 – 2572 MHz band
5 MHz channels: Centre frequencies of 2503 to 2569 MHz
10 MHz channels Centre frequencies of 2506 to 2566 MHz

[1] BRS/ERS equipment in 2500-2690 MHz band may use channel bandwidths greater than 6 MHz as permitted in 27.1220, i.e. 2x 6 MHz blocks or 12 MHz for 10 MHz channels.

6 Test Configuration

6.1 Test sample and Operating mode

The equipment under test (EUT) was:

Manufacturer	Name	Model Number	Serial Number
Airspan	AirSynergy	SYN-CN-00-0A25A-000	BB board A050CAFFF4F8

Table 1: Equipment under test

6.2 Support equipment

The support equipment was:

Description	Manufacturer	Name	Serial Number
Laptop	Dell	Latitude	Airspan 005837
Mains – 48 V PSU	Powerbox	PBUS-LUV-54V/100W-SN-QNA	P1131CV022587

Table 2: Support Equipment

6.3 Test equipment (sections 8 to 12)

Description	Manufacturer	Name	Serial Number	Calibration certificate
Receiver	Rohde & Schwarz	FSQ 26	200108	R&S Ref 38232
Signal Generator	Rohde & Schwarz	SMB100A03	175535	R&S 20-400919 16 Dec 2012
Attenator	MCL	BW-N10W20+	1224	Calibrated in-situ and loaded as Transducer Factor
RF cable	Sucoflex	104	5884/4	

Table 3: Test Equipment for conducted tests

6.4 Test equipment (section 13 and 14)

TRaC No	Equipment Type	Equipment Description	Manufacturer	Due For Cal[2]
UH387	ATS	Chamber 1	Rainford EMC	24/06/2013
UH403	ESCI 7	Recevier	R&S	27/06/2013
UH420	CBL6112	Bilog	Chase	06/07/2014
REF909	FSU26	Spectrum Analyser	R&S	04/02/2014
L138	3115	1-18GHz Horn	EMCO	08/11/2013
L572	8449B	Pre Amp	Agilent	12/12/2014
L300	20240-20	Horn 18-26GHz (&UH330)	Flann	17/11/2013
UH330	N/A	K type transition	Maury M'wave	Calibrated with L300
UH03	ESHS10	EMI receiver	R&S	08/05/1014
UH396	ENV216	LISN	R&S	30/04/2014
Eirp Substitution				
L139	3115	1-18GHz Horn	EMCO	14/09/2013
UH345	83711B	Signal Generator	HP	Not Calibrated[3]

[2] Calibration records maintained by TRaC under UKAS accreditation.
[3] Transmit signal level is measured at input to antenna using calibrated spectrum analyser

6.5 Equipment set-up

Equipment was configured as per figure 1:

- A "putty" sessions running on the laptop allows the Airsynergy unit to be controlled and set to required frequency, bandwidth, modulation and power.
- The insertion loss of the Attenuator and Co-ax cable were measured using a Signal Generator and the FSQ and their combined path-loss was programmed into the FSQ as a Transducer Factor.

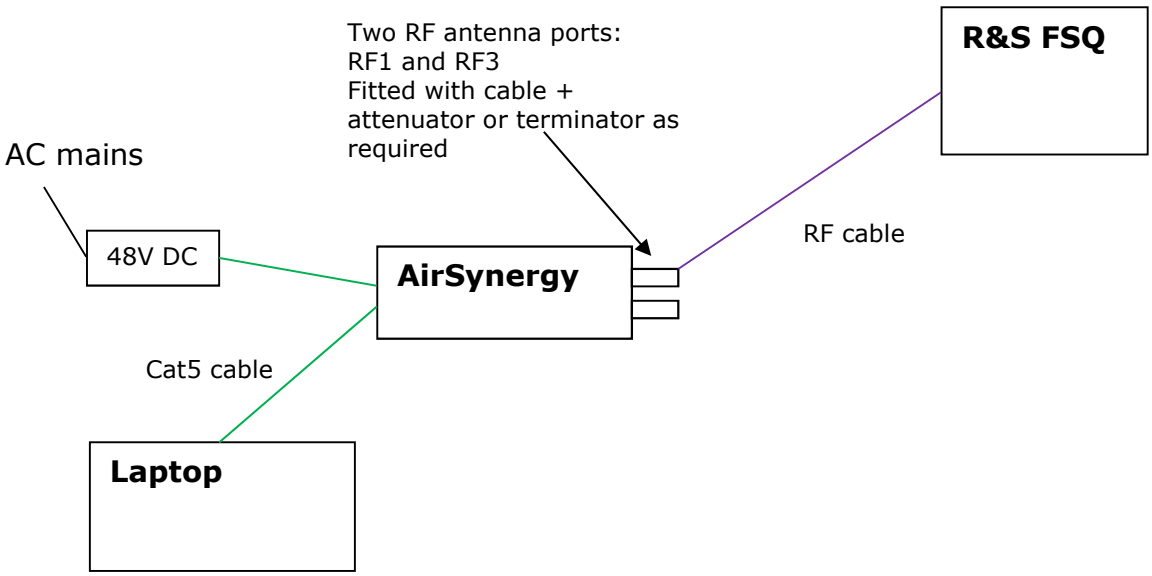

Figure 1: Airsynergy configuration for test

14 Mains Conducted Emissions

Test method as per 15.107.

Figure 17: Mains conducted emissions test set-up

TRaC Global 20 Jun 2013

Powerline Conduction 150kHz - 30MHz

EUT:	Airspan AirSynergy
Manuf:	Sulis Consultants
Op Cond:	LISN UH396, cable UH21 & Receiver UH03
Operator:	DW
Test Spec:	FCC
Comment:	Live Line, 110V, 60Hz
	EUT in normal operation (TXing) 5MHz bandwidth
Result File:	AS-LL.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	UH21
	2	9kHz	30MHz	UH396

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	2sec
	Subranges:	25
	Acc Margin:	20 dB

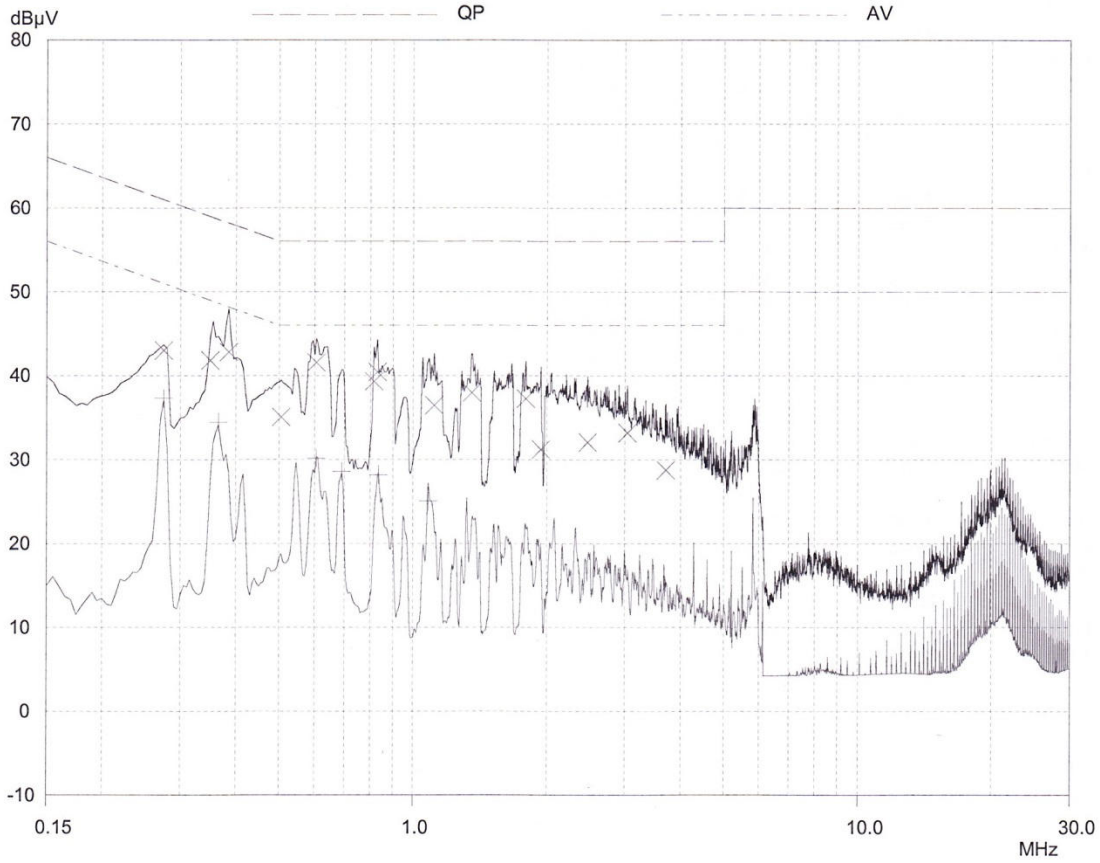

Figure 18: Mains conducted emissions; Live line scan

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Powerline Conduction 150kHz - 30MHz

EUT:	Airspan AirSynergy
Manuf:	Sulis Consultants
Op Cond:	LISN UH396, cable UH21 & Receiver UH03
Operator:	DW
Test Spec:	FCC
Comment:	Live Line, 110V, 60Hz
	EUT in normal operation (TXing) 5MHz bandwidth
Result File:	AS-LL.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	UH21
	2	9kHz	30MHz	UH396

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	2sec
	Subranges:	25
	Acc Margin:	20 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.275	43.00	60.97	17.97
0.35	41.81	58.96	17.15
0.385	42.82	58.17	15.35
0.505	35.05	56.00	20.95
0.605	41.55	56.00	14.45
0.815	39.30	56.00	16.70
0.83	40.43	56.00	15.57
1.115	36.46	56.00	19.54
1.355	37.96	56.00	18.04
1.79	37.25	56.00	18.75
1.935	31.22	56.00	24.78
2.47	32.07	56.00	23.93
3.035	33.20	56.00	22.80
3.705	28.76	56.00	27.24

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.275	37.30	50.97	13.67
0.365	34.45	48.61	14.16
0.605	30.18	46.00	15.82
0.69	28.59	46.00	17.41
0.835	28.21	46.00	17.79
1.08	25.07	46.00	20.93

Figure 19: Mains conducted emissions; Live line final measurements

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Powerline Conduction 150kHz - 30MHz

EUT:	Airspan AirSynergy
Manuf:	Sulis Consultants
Op Cond:	LISN UH396, cable UH21 & Receiver UH03
Operator:	DW
Test Spec:	FCC
Comment:	Neutral Line, 110V, 60Hz
	EUT in normal operation (TXing) 5MHz bandwidth
Result File:	AS-LL.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	UH21
	2	9kHz	30MHz	UH396

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	2sec
	Subranges:	25
	Acc Margin:	20 dB

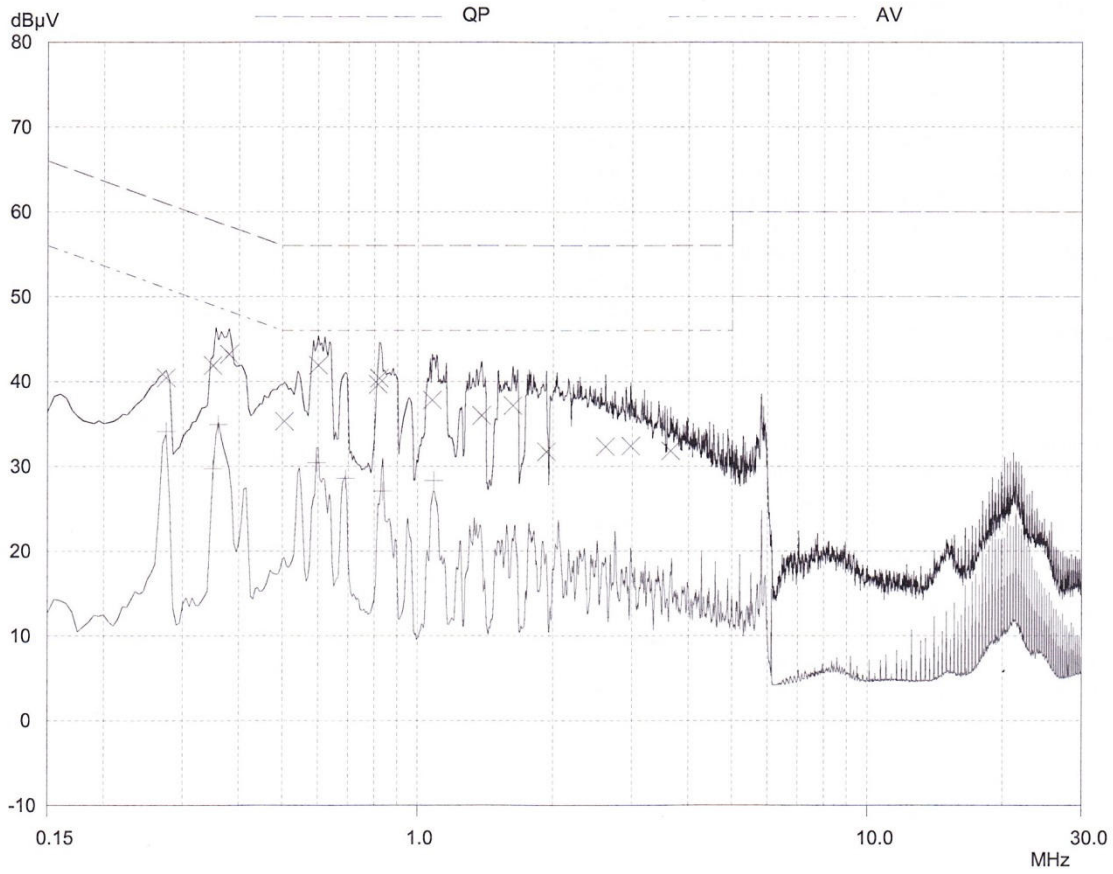

Figure 20: Mains conducted emissions; Neutral line scan

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Powerline Conduction 150kHz - 30MHz

EUT:	Airspan AirSynergy
Manuf:	Sulis Consultants
Op Cond:	LISN UH396, cable UH21 & Receiver UH03
Operator:	DW
Test Spec:	FCC
Comment:	Neutral Line, 110V, 60Hz
	EUT in normal operation (TXing) 5MHz bandwidth
Result File:	AS-LL.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	UH21
	2	9kHz	30MHz	UH396

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	2sec
Subranges:	25
Acc Margin:	20 dB

Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.275	40.42	60.97	20.55
0.35	41.87	58.96	17.09
0.38	43.22	58.28	15.06
0.505	35.30	56.00	20.70
0.6	41.91	56.00	14.09
0.815	39.64	56.00	16.36
0.82	40.37	56.00	15.63
1.075	37.79	56.00	18.21
1.385	35.96	56.00	20.04
1.625	37.15	56.00	18.85
1.93	31.74	56.00	24.26
2.615	32.33	56.00	23.67
2.975	32.39	56.00	23.61
3.65	31.82	56.00	24.18

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.275	34.10	50.97	16.87
0.35	29.73	48.96	19.23
0.36	34.92	48.73	13.81
0.595	30.43	46.00	15.57
0.69	28.59	46.00	17.41
0.835	27.05	46.00	18.95
1.085	28.33	46.00	17.67

Figure 21: Mains conducted emissions; Neutral line scan final measurements