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KMSC-01F103
731 Confirmation Number: EA559209

To: Joseph Dichoso / FCC Application Processing Branch
From: Zameel Shahat / Matsushita Electric Corp. of America

Re: FCC ID ACJ96NKX-TDA0142
Applicant: Matsushita Electric Industrial Co Ltd
Correspondence Reference Number: 21536
731 Confirmation Number: EA559209

Please note following answers to your above referenced correspondence inquiry:

1- Q) The requested output power is 126 mW. The measured conducted output power is 295 mW. Please correct/explain. This should agree with the measured EIRP and antenna gain. Please correct.

A) The measured conducted power in page 17 is 295mW. This is a typing error it should be 219mW same as measurement result at page 32 of the test report.
We will submit the test report corrections. Also we will change the Item 11 on page 4 as shown below

(present)	Typical TX power	125.9mW(21.0dBm)
(after changed)	Measured TX power(conducted)	219mW(23.4dBm)

2- Q)What is the gain? Describe the antenna. How does it get 4.77 dBi gain?

A) *Antenna gain (numeric) = EIRP /TP
Antenna gain (dB) = $10\log_{10}$(EIRP /TP)
EIRP is the max radiated power and TP is the max transmitted power.
* this antenna is half-wave length dipole.
* The following is the calculated result

CH No.	Frequency (MHz)	EIRP (W)	TP (W)	Antenna gain(Geut) (dBi)
00	2401.056	0.656	0.219	4 .7 7
46	2440.800	0.585	0.204	4.57
91	2479.680	0.498	0.186	4.27

Sample of calculated result at 2401,056 MHz, as the Maximum point:
EIRP = 28.17 dBm = $l0\log_{10}(0.656) + 30$
TP = 23.40 dBm = $l0\log_{10}(0.219) + 30$

Result = 4.77 dBi

3- Q) Provide AC power line tests.

A) The power source of Cell station is supplied from PBX unit.(DC40V,80mA maximum)
(Please refer to the attached file. "MKSC-01-F103(TDA0142).pdf")
Therefore this product have no direct connection to the AC Line.

4- Q) Provide RF safety calculations with the correct output power and antenna gain.

A) The Maximum Peak Power (EIRP) is measured as 656mW on page 30 on test eport.
The EIRP have already included the antenna gain. Considering the power density,
power should be averaged the EIRP in the total transmitting time of Whole TDMA frame.
We calculated averaged radiated power using below steps.

(Calculation step)

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The TDMA frame structure of this system is described in the attached file named
" MKSC-01-F103(TDMA frame structure).pdf ".
According to this description, maximum transmitting time of RF carrier is
calculated from below Steps.

a. Transmitting time(each slot) :Tst
Tst = transmission slot time(ex. t0 ,t1,t2,t3,t4))-Guard Space time
= 833 (micro seconds) - 96(micro seconds) =737 (micro seconds)
Considering the rising or falling time of RF output at power amplifier,
actual Tst is approximately 750 (micro seconds) .

b. Maximum time of transmitting carrier :Tmax
Tmax = Tst * 4 slots = 750 micro seconds * 4 = 3000 micro seconds= 3(msec)

c. Whole time of TDMA frame is 10msec.
So The EIRP is averaged using the ratio means Tmax /10msec.
Averaging Ratio = 3/10.

d. As a result,
Actual radiated Power is EIRP* 3/10 = 656 * 3/10 = 196.8 mW

From the above the distance between observation point and center of radiator in cm (R)
Can be calculated using the formula $R^2 = EIRP/4ps$
S = Power density in mW/cm^2
$R^2 = 196.8/4p*1$
R= 3.96 cm << 20 cm
Our operation instruction will have the following in page 14
"CAUTION: *To comply with FCC RF exposure requirements, the base unit should be installed with its antenna located at 20 cm or more from persons."*
This enable the subject device to classified as a mobile unit and exempt from SAR requirement.

5- Q) It appears that the device will not comply with the Restricted band requirements at 2483.5-2500 MHz. The emission is only 49 dB down from the peak of the fundamental emission. The fundamental emission was measured with a 100 kHz RBW. It must be measured with a 1 MHz RBW and VBW. Therefore, the level of the fundamental will be higher than 123.4 dBuV/m and the level at 2483.5 MHz will be greater than 74 dBuV/m.

A)We think the measurement condition of Band-edge compliance test described on test report could be adapted for FCC 15.247(C).
The reason is following subjects.
According to PUBLIC NOTICE document issued by FCC named" Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems", (Released March 30, 2000) the measurement setting and method for "Band- edge compliance of RF Conducted Emissions" is described as follows,
" *Use the following spectrum analyzer setting:*
Span= wide enough to capture the peak level of the emission operating on the channel closest to the band edge , as well as any modulation products which fall outside of the authorized band of operation.
RBW >= 1percent of the span.(When span is 10MHz, RBW is more than 100KHz)
VBW>= RBW(if RBW is 100KHz, VBW is available for 300KHz)"
In addition, We confirmed that the level of the fundamental does not change when using the 100KHz RBW from when using the 1MHz RBW. Therefore the level of the fundamental must be 122.2 dBuV/m at 91ch(2479.680MHz)and the level at 2483.5 MHz must be less than 74 dBuV/m. You have pointed out the fundamental level is 123.4dBuVm.
But when we confirm the compliance of Band edge emission, we think reference fundamental level should be used the level of nearest channel(91ch) from band edge.
If above requirements could be available now, we think band- edge emission level is complied for the regulation.

6- Q) Provide a few examples of the pseudorandom hop sequence.

A) The Pseudo random Hopping sequence

1- The system operates the pseudo randomly hopping sequence that is given by random hopping sequence table.
A dummy bearer that has broad cast information uses a table generated hop sequence. The sequence are generated by the following formula.
Fx(i)= (Fo(i) + x)mod 75
The sequence index "i" in the above formula is incremented (mod 75) each frame.
The value "x" is used to select the required pattern.
Obviously because of the "modulus" , there are 75 unique patterns.

2- Traffic bearers that have voice and data information use a pseudo-random number generated hop sequence. The random number generator (RNG) shall be a Linear Congruential Generator(LCG).
The general form of an LCG is:
Y(n+1)=a*Y(n)+c (mod 75)
A channel number in the range that is 0 to 71.
chan= (72*Y(n)/m
In the above formula,integer division is used.
In the case that is LCG(m,a,c,Yo),the proposed RNG of this system is LCG(3000, (2*3*4*5*7+1) = 841,787,Yo),
This is full period generator, with a period of 3000 which is 30 seconds and is also a multiple of 75. As such all channel are used equally ,and all channel are used equally over a 30 seconds period.

7 Q) Does the device transmit simultaneously on both antennas? If so, provide data. If not, provide radiated and conducted data for the other port.

A) This device does not use both antennas simultaneously. One of two Antenna is selected by receiving RF signal quality of every RF frame. (Diversity operation)
We use two same antennas and same circuitry. The two antennas have same dimensions and characteristic, and two feeding point of RF power is placed symmetrical on PCB.
Therefore we think it is enough to measure the radiation data only using one antenna.

Should you have any questions, please contact the undersigned. Thank you for your attention in this matter.

Sincerely yours,

Zameel Shahat
Project Engineer